Alternatives and Justification Analyses Guide

Levees

1.0 Introduction

One of the goals of the Office of Coastal Management (OCM) is to achieve a balance between conservation of coastal resources and development of the coastal zone. Development in the coastal zone is encouraged but avoidance of unnecessary impacts to coastal resources is essential in order to protect those resources for future generations. To accomplish this goal, OCM reviews every Coastal Use Permit (CUP) application with the objective of avoiding and/or minimizing adverse impacts wherever possible. Pursuant to La. RS 49:214.27.B and C., OCM uses the Coastal Use Guidelines, found in LAC Title 43, Part I, Chapter 7, Subpart B, §701-719, to determine the type of information needed to fully evaluate a particular use and the adverse impacts that must be avoided to the maximum extent practicable. All coastal uses must be in conformance with all applicable Coastal Use Guidelines in order to receive approval from OCM.

Part of these guidelines, §701.H, charges OCM with ensuring that the public benefits of a proposed coastal use clearly outweigh any adverse impacts to public resources resulting from that use. **Public benefits** include providing goods and/or services to users that currently do not have reasonable access to such goods and/or services, increasing permanent employment opportunities and increasing public revenues. **Coastal resources** include coastal waters, wetlands, fisheries, wildlife and unique ecological/coastal features such as ridges, cheniers, salt domes, reefs, beaches and dunes. These resources provide value to the public in the form of storm and flood protection, nursery grounds for commercial and recreational fishing, critical habitat for endangered species and improved water quality. Public resources also include existing structures and infrastructure. **Adverse impacts** are direct or indirect loss and/or negative alteration of a public resource as well as negative impact on concurrent and neighboring coastal users and include such things as increased intensity or frequency of flooding, accelerated erosion and salt water intrusion.

Review of a proposed coastal use using the Coastal Use Guidelines includes asking questions such as:

1. Can adverse impacts from a proposed use on coastal resources and/or user groups be avoided by moving the use to an area which results in less adverse impact to coastal resources and/or users?
2. If the use cannot be moved, can demand for the proposed goods and/or services in the area to which they will be introduced be documented?
3. If a use cannot be moved and demand can be demonstrated, can the use be redesigned/reconfigured, or can different methods be used to accomplish the use, which results in less damage to coastal resources?

To answer these questions, OCM requires that the applicant provide Alternatives and Justification Analyses in sufficient detail to demonstrate a thorough consideration of the

respective subjects. In an effort to recognize the differences between small and large projects, and/or low and high coastal resource impact projects, OCM has developed a tiered approach to Analysis development. Factors such as, but not limited to, the complexity of the development, surrounding land use, type and level of resource impact and coastal use objective(s) are used to determine the range of alternatives to be considered in the Alternatives Analysis and the information and level of detail required for the Justification Analysis. This guide was developed to assist applicants for Coastal Use Permits with determining, in general, the type of information and level of detail needed to fully evaluate a proposed coastal use's potential impacts and benefits and therefore it's conformance with the Coastal Use Guidelines.

To fully evaluate a proposed coastal use's benefits and impacts, Alternatives and/or Justification Analyses are required during review of a use from which adverse impacts to coastal resources are, in OCM's opinion, likely to occur. The Alternatives Analysis should address several options for project siting that are compared equally for feasibility and will allow OCM to determine the least damaging feasible site for the proposed use. The Alternatives Analysis should provide documentation that clearly demonstrates that reasonable efforts were made to find less damaging sites and should provide an explanation for why each less damaging site was not feasible. The Alternatives Analysis also should address alternate site configuration, alternate methods of construction, and how adverse impacts to coastal resources will be minimized.

The Justification Analysis should include sufficient detail to clearly demonstrate demand for the proposed use and will allow OCM to determine the public need the proposed use. The Justification Analysis should explain the goods and/or services that the proposed coastal use will provide and include documentation that clearly demonstrates a public demand for, or public benefit resulting from, the proposed use. The analysis should provide enough information for OCM to determine that there is a reasonable chance that the project will be successful and not result in a situation where large scale destruction of resources is permitted for a project that fails economically, floods, causes flooding on adjacent areas or in some other way fails the public.

In general, the greater the resource or user group impacts, the more detail required for both the Alternatives and Justification Analyses. If reviewing this guide prior to submission of a Joint Permit Application (JPA) form, the information presented herein should be taken into consideration and addressed while developing the project. In most cases, alternatives, or the lack thereof, are evident and a simple discussion of the options considered is sufficient. This information can be provided in steps 11b-c of the JPA. If the information is not provided in or attached to the JPA, the OCM permit analyst will review the project and determine if any less damaging alternatives are evident. Additional information may be requested by the permit analyst in order to address the less damaging options he/she identified. Using the information contained in these analyses, OCM can effectively evaluate the proposed coastal use's conformance with the applicable Coastal Use Guidelines (specifically §701.F.3, 5, 7, 8, 10, 13, 16 and 19; §701.G.2 and 6; §701.H; §701.I; and all applicable Use Specific Guidelines).

A **levee** is defined as an embankment or wall to control or prevent water movement, to retain water or other material, or to raise a road or other lineal use above normal or flood water levels. Examples include levees, dikes, flood walls and embankments of any kind. If, in

OCM's opinion, adverse impacts to coastal resources will occur during construction, maintenance and/or operation of a proposed activity, Alternatives and Justification Analyses will be required. The level of detail needed in the Analyses is dependent on whether the activity is maintenance of existing features, expansion of existing features or installation of new features. Please note that a feasibility study done during the course of project development can be submitted as the Alternatives and Justification Analyses. If a feasibility study has not been done, the below information will assist in the development of Alternatives and Justification Analyses. OCM encourages applicants to avoid adverse impacts to coastal resources to the maximum extent practicable and will provide assistance with identifying alternate sites, minimizing impacts and developing a Justification Analysis.

2.0 Maintenance of Existing Levees

Maintenance of existing levees includes re-establishing original design/construction specifications, repair of breaches and maintenance/placement of erosion control measures on currently existing levee features. If, in OCM's opinion, adverse impacts to coastal resources may occur from proposed maintenance activities, brief Alternatives and Justification Analyses will be required. The information required in the analyses is dependent on the nature of the maintenance activity and the extent of resource impacts.

2.1 Alternatives Analysis

OCM recognizes that maintenance activities are site-specific therefore an Alternatives Analysis for maintenance activities need not address alternate sites for performing the activity. The analysis instead should address methods and equipment to be used to perform the maintenance activity, the access route to the maintenance site, the size of the work area around the maintenance site and the siting of staging area(s) that minimize adverse impacts to coastal resources to the maximum extent practicable. Only those aspects of the proposed maintenance activity that result in adverse impacts to coastal resources need be addressed. The analysis can take the form of a brief narrative that identifies all practical options for performing the work and siting the staging areas.

2.1.1 Method(s) and Equipment

OCM understands that the methods and equipment used to perform the maintenance activity may be limited by the type of activity to be done. If the methods and/or equipment used to perform the maintenance activity will result in adverse impacts to coastal resources, and options exist, the Alternatives Analysis should include:

1. An explanation of the method(s) and equipment to be used to access the site and perform the maintenance work, including source of fill. The narrative should identify and discuss all practical options for performing the work, including the use of hauled in fill in lieu of fill excavated on site, and explain why each option was eliminated or chosen. If using economics as a deciding factor, provide cost comparisons of hauled in fill versus fill excavated on site for all options considered.

2. An explanation of any limiting factors and special equipment requirements.

2.1.2 Access

Access to the repair site should be selected to minimize adverse impacts to coastal resources. If adverse impacts to coastal resources will occur during access, the above narrative should include:

3. A map showing location, length and width of proposed and alternate access routes considered. This can be displayed on the project vicinity map or plan view plat.

4. An explanation of why each route was eliminated or chosen. Routes should be compared using the same criteria and should include a consideration of coastal resource impacts. Access equipment identified in #1 above should be route appropriate and should be selected to minimize adverse impacts.

2.1.3 Staging and Work Areas

The staging and work area(s) needed to perform the maintenance activities should be of the minimum size necessary to safely store and access equipment and perform the maintenance activity. The staging area should be located on a site that avoids adverse impacts to coastal resources. If coastal resources will be impacted adversely by staging and/or work areas, the above narrative should include:

3 A discussion of all practical staging area locations and an explanation of why each was eliminated or chosen. The narrative also should explain the need for the size(s) of the staging and work area(s), any limitations that may be present on site and any special equipment requirements. Maps, illustrations and site layout plans may helpful in demonstrating space requirements and limitations.

2.2 Justification Analysis

The Justification Analysis for maintenance activities should be a narrative that explains the nature and extent of the proposed maintenance work and why the maintenance work is required (i.e. identify the consequences of not performing the maintenance activities).

3.0 Expansion of Existing Levees

Expansion of existing levees includes raising and widening of currently existing levee features and re-establishing substandard levees to previous or expanded design grades. Expansion activities that have adverse impacts on coastal resources will require Alternatives and Justification Analyses.

3.1 Alternatives Analysis

OCM recognizes that existing levee expansion activities are limited to the location of the existing levee therefore an Alternatives Analysis need not address alternate alignments. However alternatives still exist, such as shifting the centerline to avoid or minimize impacts to coastal resources and raising or relocating existing structures in the protected area to eliminate the need for expanding the levee. The Alternatives Analysis should address the methods and

equipment to be used to perform the expansion activity, the method of access to the expansion site, the size and location of the associated work area around the expansion site and other options for protecting structures that minimize adverse impacts to coastal resources to the maximum extent practicable. Only those aspects of the proposed expansion activity that result in adverse impacts to coastal resources need be addressed. The analysis can take the form of a brief narrative that identifies all practical options for performing the work and siting the staging areas.

3.1.1 Method(s) and Equipment

OCM understands that the methods and equipment used to perform the expansion activity may be limited. If the methods and/or equipment used to perform the maintenance activity will result in adverse impacts to coastal resources, and options exist, the Alternatives Analysis should include:

1. An explanation of the method(s) and equipment to be used to access the site and perform the expansion work, including the source of any fill material used. The narrative should identify and discuss all practical options for performing the work, including the use of hauled in materials in lieu of material excavated on site, and explain why each option was eliminated or chosen. If using economics as a deciding factor, provide cost comparisons of hauled in fill versus fill excavated on site for all options considered.

2. An explanation of any limiting factors and special equipment requirements.

3.1.2 Access

Access to the expansion site should be selected to minimize adverse impacts to coastal resources. If adverse impacts to coastal resources will occur during access, the above narrative should include:

3. A map showing location, length and width of proposed and alternate access routes considered. This can be displayed on the project vicinity map or plan view plat.

4. An explanation of why each route was eliminated or chosen. Routes should be compared using the same criteria and should include a consideration of coastal resource impacts. Access equipment identified in #1 above should be selected to minimize adverse impacts.

3.1.3 Staging and Work Areas

The staging and work area(s) needed to perform the expansion activities should be of the minimum size necessary to safely store and access equipment and perform the expansion activities. The staging area should be located on a site that avoids adverse impacts to coastal resources. If coastal resources will be impacted adversely by staging and/or work areas, the above narrative should include:

5. A discussion of all practical staging area locations and an explanation of why each was eliminated or chosen. The narrative also should explain the need for the size(s) of the staging and work area(s), any limitations that may be present on site and any special equipment requirements. Maps, illustrations and site layout plans may helpful in demonstrating space requirements and limitations.

3.1.4 Other Options

Other options should be considered in lieu of expansion activities that adversely impact coastal resources. For example, it may be feasible and more cost effective to move or elevate structures in the protected area to reduce or eliminate the risk of flooding. An Alternatives Analysis for expansion activities that may result in adverse impacts to coastal resources should address these options. The analysis can be a narrative that includes:

6. The type of structures and number of each type of structure in the protected area.

7. A comparison of costs for levee expansion activities versus relocating or elevating protected structures. The cost of the expansion activities should include the frequency and cost of anticipated future levee maintenance work.

3.2 Justification Analysis

The Justification Analysis should clearly demonstrate a public need and/or demand for the proposed levee expansion. The analysis should include data that identifies the entire area to be affected; the number and type (house, business, church, etc.) of structures located within that area; the current water flow patterns into and out of that area; and the frequency and severity of historic flooding events in that area. The Justification Analysis can take the form of the feasibility study done during the normal course of project planning and should be provided in its entirety. If a feasibility study has not been done, please refer to the outline for a Justification Analysis in the New Levee section below.

4.0 New Levees

New levee features include the construction of previously non-existent levees and the lengthening of existing levees into previously non-leveed areas. If, in OCM's opinion, adverse impacts to coastal resources may occur during or after construction, Alternatives and Justification Analyses will be required. Please note that a feasibility study done during the course of project planning can be submitted as the Alternatives and Justification Analyses.

4.1 Alternatives Analysis

Every effort should be made to site levees such that adverse impacts to coastal resources are avoided or minimized to the maximum extent practicable. Ideally, levees should be located on the non-wetland side of the wetland/non-wetland interface. Consideration must be given to using hauled in fill instead of excavating fill material from wetland areas.

The goal of an Alternatives Analysis is to find a route for the proposed levee which results in the least amount of adverse impact (both direct and indirect) to coastal resources while

allowing the project to fulfill its main objective(s). The Alternatives Analysis provides an objective method of performing a fair and thorough consideration of feasible options for the location, construction, operation and maintenance of the proposed levee feature. OCM encourages applicants to utilize routes that avoid or minimize both direct and indirect adverse impacts to coastal resources to the maximum extent practicable. **Feasible routes** are defined as any route that can support the main objective(s) of the proposed development. Current aerial photography and/or specific knowledge of the area can be used to identify feasible routes. Project objective(s), surrounding land use, total project impact and type and extent of coastal resource impacts should be considered when selecting feasible alternative routes.

Documentation that clearly demonstrates that each route was compared equally and explains why each route was eliminated or chosen will be required. Documentation that supports the reasons for elimination should be included with the analysis. All alternate routes and the preferred route must be compared using, at a minimum, the factors identified below. If other factors not identified by OCM are used to compare sites, please define those factors and explain how they were used to evaluate each route. Table 1 can be used to determine the minimum range of alternatives that should be considered when developing an Alternatives Analysis.

Table 1 – Determining the Range of Alternatives that should be considered when proposing a new levee feature.

	Resource Impacts (% of total project impacts)		
Scope of Development	Low (<10%)	Med (10.01-30%)	High (>30.01%)
Small (one mile or less)	Category 1	Category 2	Category 3
Large (more than one mile)	Category 2/3*	Category 2/3*	Category 3
* If more than 10 acres of resource impact will occur, higher level of detail is required.			

Coastal resources, particularly wetlands and coastal waters, which become isolated inside of the protected area must be included as adverse impacts. OCM recommends that culverts, or other water control structures, be inserted in the levee such that normal water exchange can be maintained during normal conditions. Otherwise, mitigation will be required for wetlands that become isolated in addition to mitigation required for direct impacts from the levee footprint.

A minimum of three (**Category 1**), five (**Category 2**) or seven (**Category 3**) alternate feasible routes must be considered. Each route should be compared using the same parameters and should, at a minimum, include the items listed below.

1. Define the project objective(s) and identify all of the proposed features required to meet the objective(s). Identify any project objectives that may limit the range of alternatives to be considered. Identify the area(s) to which the proposed levee feature will provide protection.

2. Identify, on a map, each route considered. If less than the minimum number of routes specified above have been considered, please explain why and provide documentation demonstrating the efforts made to find alternate routes.

3. Describe each route considered. Include topography, water/wetland interface, effects on surface hydrology, habitat type(s) present and amount of impact to each, and cost. If access to the property is limited or unavailable, explain the limitations and provide any available information about the route using current photography and topographic and habitat maps. Identify any limiting factors and explain how those factors limit or restrict construction of the project.

4. Provide a narrative that explains the minimum necessary width of the proposed right-of-way. Include any regulatory or engineering requirements and site limitations that affect the width chosen. If material will be excavated on-site, include a comparison of using hauled in fill in lieu of excavating material on-site. Illustrations and site layout plans may helpful in demonstrating space requirements and limitations.

5. A no-build option also is an acceptable alternative. This option may include elevating or relocating structures currently existing in the area proposed for protection and must be addressed in the Alternatives Analysis. A no-build discussion should include the number and types of structures (homes, businesses, churches, etc.) affected and the estimated costs of raising or relocating those structures compared to the cost of construction and future maintenance of the proposed levee.

6. Provide a narrative explaining the reasons for the elimination or selection of each route. Please note that the factors used to compare each route should be identified and should be consistent among routes.

4.2 Justification Analysis

The Justification Analysis should clearly demonstrate a public need or demand for the proposed levee. The analysis should include data that identifies the entire area to be affected, the number and type (houses, businesses, churches, etc.) of structures located within that area; the current water flow patterns into and out of that area; and the frequency and severity of historic flooding events in that area. The most common form of Justification Analysis for new levees is the feasibility study done during the normal course of project planning and should be provided in its entirety. Hydrology studies may be required depending on the size of the area to be affected by the levee. If no formal feasibility studies have been done, Table 2 can be used to determine the level of detail required in the Justification Analysis. Please note that if the levee is part of the State of Louisiana's Master Plan for a Sustainable Coast no further justification will be required.

Table 2 – Determining the level of detail required in the Justification Analysis.

	Resource Impact (% of total impact)			
Size of Development	Low (≤20%)	Med (20.01-70%)	High (>70.01%)	**Surrounding Land Use** †
Small (less than 1 mile)	S	S/M *	M	High (dense residential/commercial/industrial)
	S	S/M *	M	Moderate (light residential/commercial, agriculture)
	M	M	C	Low (no development)
Large (1 mile or more)	S	S/M **	M/C **	High
	S/M **	M/C **	M/C **	Moderate
	M/C **	C	C	Low
* If more than 2 acres of resource impact will occur, higher level of detail is required. ** If more than 10 acres of resource impact will occur, higher level of detail is required. † Refers to the type and extent of the uses occurring on lands in the vicinity of the proposed development				

4.2.1 Simple (S)

1. Provide a narrative that explains the need for the levee.

2. Identify the type and number of structures to be protected.

3. Provide a narrative and illustrations that clearly explain and demonstrate the existing and proposed water flow patterns in the areas inside and outside of the proposed levee.

Please note that additional information may be required in response to comments received during the public notice period.

4.2.2 Moderate (M)

Provide information for 1-3 above, plus:

4. If coastal resources (mainly vegetated wetlands) will be isolated from coastal influences by impoundment within the protected area, explain why this impoundment cannot be avoided (impoundment can be avoided by building at the wetland/non-wetland interface and/or by using water control structures to maintain normal water flow patterns during non-flood events).

5. Include in #1 above historic information related to past flooding events and explain how the levee will prevent future flooding events.

6. Include in #2 above any planned or projected future development.

7. Provide population trend data for the last 10 years in the area that is to be protected.

Please note that additional information may be required in response to comments received during the public notice period.

4.2.3 Complex (C)

8. Provide a formal feasibility study that, at a minimum, addresses items 1-7 above. Please note that the feasibility study must include consideration of no-build alternatives.

9. Provide a pre- and post-construction hydrology modeling study.

5.0 Available Sources:

5.1 Population Data

http://www.huduser.org/portal/datasets/socds.html
http://www.reis.com/index.cfm
http://www.census.gov/econ/census07/
http://www.bls.gov/cew/map_application.htm